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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,811	03/12/2004	Randy L. Hoffman	200316545	8370

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INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER
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LANDAU, MATTHEW C

ART UNIT	PAPER NUMBER
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2815

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/19/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/799,811

Applicant(s)

HOFFMAN ET AL.

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 17-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 31-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

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## **DETAILED ACTION**

### ***Response to Amendment***

The amendment filed November 30, 2006 has been received and entered.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Election/Restrictions***

Claims 17-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in the reply filed on January 26, 2006.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-13, 15, 33-35, and 39-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 39, the limitation "wherein the channel includes one or more of a metal oxide including zinc-gallium, cadmium-gallium, cadmium-indium" renders the claim indefinite. It is not clear if the limitation requires one or more metal oxides containing zinc-gallium, cadmium-gallium, and cadmium-indium (meaning a metal oxide containing all three

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binary groups), or if the limitation is intended to claim one or more metal oxides containing zinc-gallium, cadmium-gallium, or cadmium-indium, or if the limitation is intended to claim a metal oxide channel containing at least one of zinc-gallium, cadmium-gallium, and cadmium-indium, or if the limitation is intended to claim one or more metal oxides containing at least one of zinc-gallium, cadmium-gallium, and cadmium-indium. It is suggested the claims be amended for clarification regarding the scope of the claim.

Regarding claim 2, the limitation “wherein A and B are each in a range of 0.05 to 0.95” renders the claim indefinite. The letters A and B represent the different metals, not the atomic composition of those metals. Therefore, it is unclear how A and B can be in a range of 0.05 to 0.95. It is suggested the claim be amended to state that metal (A) has an atomic composition x, and metal (B) has an atomic composition y, and that both x and y are in a range of about 0.05 to about 0.95 (or something similar). It would appear that the ratio should also be (x:y) instead of (A:B). Note that claims 5, 7, 9, 11, 13, 41, 43, and 45 have the same or similar problems.

Regarding claim 3, the limitation “the channel includes at least one of an amorphous form, a single-phase crystalline form, and a mixed-phase crystalline form” renders the claim indefinite. The independent claim (claim 1) recites, “at least one metal oxide of the channel is of an amorphous form”. It is unclear how the channel can be both amorphous (as required by claim 1) and crystalline (particularly single-phase crystalline); it must be either one or the other. Further, the limitation “of an amorphous form” in claim 3 should be eliminated since it fails to further limit claim 1. Note that claims 15 and 46 have the same problem.

Regarding claim 6, the limitations “ $A_xB_xC_xO_x$ ” and “each x is independently a non-zero integer” render the claim indefinite. According to standard terminology used in the art, the

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above formula would indicate that each element has the same atomic composition. Therefore, it is unclear how each x can be independent. For the purposes of this Office Action, it will be considered that each value for x is different. However, if Applicant wishes to assign different atomic composition values to the different elements (A, B, C), different variables should be used. For instance, the above formula should be written  $A_xB_yC_zO_v$  (or something similar). The claim should be amended accordingly. Note that claims 7, 10, 11, 33, 34, and 42-45 have the same or similar problems.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 14-16 are rejected under 35 U.S.C. 102(a) as being anticipated by Yagi (US PGPub 2003/0111663).

Regarding claims 14 and 15, Figure 1 of Yagi discloses drain and source electrodes (30 and 28, respectively); means for controlling current flow (channel 26) electrically coupled to the

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drain and source electrodes, wherein the means for controlling current flow is comprises at least partially of a channel in amorphous form (paragraph [0040], lines 3-6); and a gate electrode 22 separated from the channel by a gate dielectric 24.

Regarding claim 16, Yagi discloses the source, drain and gate electrodes (28, 30, and 22, respectively) include a substantially transparent material (paragraph [0021]).

Claims 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Noguchi (US Pat. 5,289,016).

Regarding claims 14 and 15, Figure 1 of Noguchi discloses drain and source electrodes (7/8); means for controlling current flow (channel 4) electrically coupled to the drain and source electrodes, wherein the means for controlling current flow is comprises at least partially of a channel in amorphous form (col. 3, lines 10-12); and a gate electrode 2 separated from the channel by a gate dielectric 3.

Claims 14-16, 31, and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Hoffman et al. (US PGPub 2005/0017244, hereinafter Hoffman).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

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inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Regarding claims 14 and 15, Figure 1 of Hoffman discloses a semiconductor device comprising: a drain electrode 22; a source electrode 20; means for controlling current flow (channel 18) electrically coupled to the drain electrode and the source electrode, wherein the means for controlling current flow is comprised at least partially of a channel in amorphous form (paragraph [0016], lines 13 and 14); and a gate electrode 12 separated from the channel by a gate dielectric 16.

Regarding claim 16, Hoffman discloses the source, drain and gate electrodes include a substantially transparent material (ITO) (paragraph [0011]).

Regarding claim 31, Figure 1 of Hoffman discloses a drain electrode 22; a source electrode 20; a channel including a multicomponent oxide ( $\text{ZnSnO}_x$ ), wherein the multicomponent oxide is of an amorphous form (paragraph [0016]); a gate electrode 12, and a gate dielectric 16 positioned between the gate electrode and the channel. Note that the various method steps, including the limitations “providing a precursor composition...” and “depositing a channel including the precursor composition...” are merely product-by-process limitations that do not structurally distinguish the claimed invention over the prior art. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966. In this case, the multicomponent oxide ( $\text{ZnSnO}_x$ ) disclosed by Hoffman could have been made from

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a precursor composition including at least zinc oxide. Therefore, the various process limitations do not structurally distinguish the claimed invention over Hoffman.

Regarding claim 32, the limitation “wherein the step for depositing a channel includes a ink-jet deposition technique” is merely a product-by-process limitation that does not structurally distinguish the claimed invention over the prior art.

Claims 1-5, 14-16, 31, 32, 36-41, and 46 rejected under 35 U.S.C. 102(b) as anticipated by Cillessen et al. (US Pat. 5,744,864, hereinafter Cillessen).

Regarding claims 1, 3, 31, 36, and 46, Figures 1 and 2 of Cillessen discloses a semiconductor device, comprising: a drain electrode (2 or 3); a source electrode (2 or 3); a channel 4 contacting the drain electrode and the source electrode, wherein the channel includes one or more of a metal oxide including zinc-gallium ( $\text{ZnGa}_2\text{O}_4$ ) or cadmium-gallium ( $\text{CdGa}_2\text{O}_4$ ) (col. 5, lines 34-42, especially line 42); a gate electrode 5; and a gate dielectric 6 positioned between the gate electrode and the channel. It is inherent that the  $\text{ZnGa}_2\text{O}_4$  or  $\text{CdGa}_2\text{O}_4$  film is amorphous when deposited by vapor deposition (i.e., sputtering) as disclosed by Cillessen (col. 5, lines 43-45). Regarding claim 31, the various method steps, including the limitations “providing a precursor composition...” and “depositing a channel including the precursor composition...” are merely product-by-process limitations that do not structurally distinguish the claimed invention over the prior art, since Cillessen discloses all the claimed structural features. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is



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unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966. In this case, the  $\text{ZnGa}_2\text{O}_4$  material disclosed by Cillessen can be formed from zinc oxide and gallium oxide precursors. Regarding claim 36, Cillessen further discloses applying a voltage to the gate electrode to effect a flow of electrons through the channel (col. 5, lines 25-29).

Regarding claims 2, 5, and 41, Cillessen discloses the metal oxide in the channel is  $\text{InGaO}_3$  (col. 5, lines 40-42). Therefore, the atomic composition of In (metal A) is 0.2 and the atomic composition of Ga (metal B) is 0.2.

Regarding claim 4, Figures 1 and 2 of Cillessen discloses the metal oxide includes zinc-gallium-oxide (col. 5, lines 34-42).

Regarding claims 14 and 15, Figures 1 and 2 of Cillessen discloses a semiconductor device, comprising: a drain electrode (2 or 3); a source electrode (2 or 3); a means for controlling the current flow (channel region 4) electrically coupled to the drain electrode and the source electrode; and a gate electrode 5 separated from the channel by a gate dielectric 6, wherein the channel region is at least partially amorphous (inherent, as indicated above).

Regarding claims 16 and 40, Cillessen discloses the source (2 or 3), drain (2 or 3), and gate electrode 5 includes a substantially transparent material (col. 4, lines 27-29 and 35-37).

Regarding claim 32, the limitation "wherein the step for depositing a channel includes an ink-jet deposition technique" is merely a product-by-process limitation that does not structurally distinguish the claimed invention over the prior art. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same

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as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966.

Regarding claim 37, Cillessen discloses the semiconductor device (transparent switching element) is used as a switch in a display device (col. 2, line 63 – col. 3, line 9).

Regarding claim 38, it is inherent that the electrons conduct through the channel in a linear region of operation, since the channel is a linear region.

Regarding claim 39, Figures 1, 2, and 8 of Cillessen disclose a display device (Figure 8), comprising: a plurality of pixel devices 30 configured to operate collectively to display images, where each of the pixel devices includes a semiconductor device 1 configured to control light emitted by the pixel device, the semiconductor device including: a drain electrode (2 or 3); a source electrode (2 or 3); a channel 4 contacting the drain electrode and the source electrode, wherein the channel includes one or more of a metal oxide including zinc-gallium (col. 5, lines 34-42, especially line 42), wherein the metal oxide is amorphous (inherent, as indicated above); a gate electrode 5; and a gate dielectric 6 positioned between the gate electrode and the channel and configured to permit application of an electric field to the channel.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re*

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*Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 14 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6, 11, and 16 of U.S. Patent No. 7,145,174. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 6, 11, and 16 of the '174 patent contains all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6, 21, and 31 of copending Application No. 10/763353. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 6, 21, and 31 of Application No. 10/763353 contain all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 48 of copending Application No. 10/961507.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 48 of Application No. 10/961507 contains all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 11 of copending Application No. 11/257935.

Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 11 of Application No. 11/257935 contains all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 14, 36, and 39 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 11 and 13 of copending Application No. 10/799838. Although the conflicting claims are not identical, they are not

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patentably distinct from each other because claims 11 and 13 of Application No. 10/799838 contains all the limitations of claims 1, 14, 36, and 39 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 10 and 21 of copending Application No. 10/799318. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 10 and 21 of Application No. 10/799318 contain all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 2 of copending Application No. 10/799839. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 2 of Application No. 10/799839 contains all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3, 19, and 57 of copending Application No. 10/799961. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 3, 19, and 57 of Application No. 10/799961 contain all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3 and 53 of copending Application No. 11/043647. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 3 and 53 of Application No. 11/043647 contain all the limitations of claim 14 of the instant application. It has been generally held that a broad, generic claim is unpatentable over a narrow, species claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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*Response to Arguments*

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Matthew C. Landau

December 15, 2006